Technical Notes & Archival Reference

« Rêveries »

by

Yves Gauvreau

Collector's Edition, 2025

This reference document details my workflow from image capture to the finished book and its accompanying elements. It offers *in-depth technical* insight into every aspect of my photographic process and the *craftsmanship* behind the book's creation.

June 24, 2025

Contents

1 Foundations **3**
- 1.1 Introduction 3
- 1.2 Exposure 3
- 1.3 Further Reading 3
- 1.4 Raw development and Conversion 3
- 1.5 Closing reflection 4
- 1.6 Further Reading 4
- 1.7 Tools and Software 4

2 Post-Processing **4**

3 Printing **5**
- 3.1 Paper selection 5
- 3.2 Why image dependent gamut mapping 5
- 3.3 Print Longevity 6
- 3.4 Final Thoughts 6
- 3.5 Further Reading 6

4 Color Management & ICC Profiling **6**
- 4.1 Measurement Protocol & Viewing Conditions 6
- 4.2 B&W Printing 6

5 Materials & Archival Considerations **6**
- 5.1 Printing 7
- 5.2 Paper 7
- 5.3 Interleaving Sheets 7
- 5.4 Thread & Assembly 7
- 5.5 Binding and Enclosure 7

6 Environmental & Ethical Considerations **7**

7 Notes On The Relevance Over Time **7**

References **8**

1 Foundations

1.1 Introduction

There's a lyric, I adapted from:
"A Horse with No Name" by Dewey Bunnell, ©1971

> *"In the desert, you can remember your name 'Cause there ain't no one for to give you no name."*

That solitude is essential to my work — the freedom to listen and to see deeply, free from noise and distraction. In that quiet space, where trends and expectations dissolve like shadows at dawn, only clarity, intention, and light remain. Photography, for me, means creating with light—shaping it deliberately, as raw material to build an image. Especially in black and white, photography becomes an extension of my inner vision, a tangible representation of something intangible. It's about revealing what I perceive and meticulously crafting it into existence. But to achieve that, I need solid foundations.

1.2 Exposure

The ETTR (Expose To The Right) method, when rigorously applied, maximizes signal quality at the sensor level. The goal here is purely technical: optimal exposure.

When applied properly, ETTR offers meaningful gains in:

- Signal-to-noise ratio (SNR)
- Usable dynamic range during post-processing
- Color accuracy

Understanding the nature of light—and how the sensor responds to it—is essential. SNR, and therefore image quality, is directly proportional to the square root of photons captured. Optimizing this at the moment of exposure is critical, yet camera previews and histograms are almost always misleading. To counter this, I rely on RawDigger to inspect actual raw data. Historically, 18% gray (about 2.5 stops below overexposure) was considered a standard reference—a legacy of film's era. Modern sensors, however, offer significantly greater headroom. Their internal meter calibrations vary widely by brand and ISO setting, rendering the old standard more or less obsolete. Calibrating your camera's metering system is therefore a necessary first step. I include references below to assist with this. But it's just a first step. You know, the big thing you have above your shoulders — that's your AI engine on steroids. You decide what value you want each part of the image to fall on. That responsibility is yours and yours alone, that's authenticity... That said, ETTR alone is not enough. Most raw converters still rely on outdated assumptions about exposure calibration. To fully benefit from a technically optimal capture, I work in a scene-referred workflow a method increasingly adopted by those seeking tonal and color accuracy at the highest level. Unlike display-referred pipelines, which prioritize screen-friendly and subjective results, the scene-referred approach preserves the actual physical properties of the captured light, and colors.

1.3 Further Reading

Theory:

- Clarkvision: Digital Signal to Noise [10]
- Usable dynamic range during post-processing [33]

Practical:

- RawDigger: Beware of the Histogram [30]
- FastRawViewer: Using Full Dynamic Range [15]

1.4 Raw development and Conversion

Building on that optimal capture, the next step is equally crucial: extracting and converting this raw data as accurately as possible.

At this stage, the objective is clear: extract every details of light and color the camera has captured. This means converting from the camera's native color space — or how the camera sees colors — into a more human vision kind of colorspace. We need an RGB space capable of preserving every nuance of luminance and color as faithfully as possible, while still remaining practical.

My strategy to fully exploit this potential, is first to apply DXO PureRaw to my RAW files, for both advanced noise reduction and advanced demosaicing

resulting in a DNG file — a different form of RAW. Next, I use DCRaw_Emu to convert from the camera colorspace to a 16-bit tiff file with a custom linear gamma version of ProPhoto RGB. This is already a fine image that some call a scene-referred image.

Light is a strange beast. Beside its intensity, we rely also on its color, or temperature. Unfortunately, though often considered a good predictor of color, white balance alone is usually insufficient to obtain accurate and optimal colors.

And here is how, at each session, I photograph a ColorChecker [11], I use this shot in the same light condition and process it using the same workflow as described above. In a program called 3DLut Creator it is used to create a correction Lut. What it does is relatively simple, the Colorchecker has 24 patches of known colors and neutral values, and the program tries to adjust all the colors in the image such that the error on average is minimal.

From this shot we create what is called a Lut (Look-Up Table) that minimise the difference. When applied in Photoshop, or other similar programs, it brings the colors, the neutrality or white balance and the level of luminosity very close to the actual measured values of the ColorChecker. Then other images, shot in the same light conditions, become a quasi perfect version of the actual scene. This is the ultimate accuracy, your image can attain, an A+. With this method we can reliably achieves remarkable accuracy ($\Delta E_{00} < 2$). As a bonus, you can really claim it's 100

My workflow integrates various specialized tools: DCRaw_Emu for precise and unbiased raw data extraction, PureRaw4 by DXO for noise reduction and custom demosaicing, 3DLut Creator for nuanced color grading and automated ColorChecker based corrections, complemented by Adobe Photoshop and Lightroom. Recently, I started creating and using custom DCP profiles based on my camera's Spectral Sensitivity Function (SSF), integrated seamlessly into Lightroom.

While complex, the resulting master file justifies the rigor. This approach echoes Ansel Adams' classic methodology, where meticulous exposure and development ensured optimal image quality. If you've explored that tradition, you know exactly what I mean.

1.5 Closing reflection

A photograph is not simply taken—it's carefully built. It starts with quiet intention, grows through precise exposure, and solidifies in meticulous development. This structured approach is my own interpretation of Ansel Adams' "Expose for 0.1D above base + fog, and develop for whites" the dependable foundation upon which meaningful work is crafted.

1.6 Further Reading

- Scene-referred vs. Display-referred [32]
- Darktable – Scene-referred workflow [13]

1.7 Tools and Software

A complete archive of the tools used in my workflow will be made available separately. The location and access details will be updated shortly.

- Lightroom [25]
- Photoshop [27]
- 3DLut Creator [1]
- PureRaw [29]
- LibRaw–DCRaw_Emu [24]
- ArgyllCMS [6]
- DCamProf [14]
- Camera SSF Estimation [9]
- ColorChecker [11]

2 Post-Processing

Post-processing today is akin to opening Pandora's box—the tools available can unleash possibilities beyond imagination, but it is not about fixing mistakes; it's about realizing intent. Every adjustment is a decision that shapes meaning.

With billions of photos captured daily, standing out demands creativity and originality. Define your own rules, cultivate your vision, and make your images uniquely yours.

3 Printing

My printing process—like my RAW development—is meticulously calibrated and grounded in industry best practices. It begins not at the printer, but at the moment of capture, within a scene-referred workflow.

It starts with the understanding that a source image can be used to output on many different devices, each with its own characteristics, pluses, and minuses. In the near future, we may have displays capable of showing us all the colors our modern printers can reproduce. For now, great care must be taken not to discard colors your printer can reproduce, but that a standard monitor cannot display.

Standard displays restrict what you can perceive, making it impossible to fully evaluate your image, let alone realize the potential of your printer, inks, and papers. Ideally, a **wide-gamut, 10-bit display covering at least 99% of Adobe RGB** is essential.

A warning: especially if you are going to print your images, an HDR display is a greater distraction than a good wide-gamut display.

Modern printers, papers, and inks frequently surpass the sRGB and even Adobe RGB gamuts. As we await future displays capable of rendering the entire Rec. 2020 colorspace, today's careful calibration and profiling ensure the highest print quality, and accuracy achievable.

3.1 Paper selection

Critical factors in evaluating paper include:

- **Gamut:** Using a printer with 8 or more inks maximizes achievable color range, often exceeding monitor capabilities.
- **DMax:** Essential for matte papers to achieve deep blacks; glossy papers usually excel here naturally.
- **Paper whiteness:** Understanding paper whiteness [8].
- **Optical Brightening Agents (OBAs) [7]:** Avoided for archival stability. OBAs degrade over time, causing color shifts.
- **Texture:** Subjective, chosen based on individual preference and artistic intent.

I consistently use paper sample packs to print a standardized evaluation image available here [28]. It's a 16-bit TIFF in ProPhoto RGB. This practice ensures reliable assessments. For profiling, I generate custom ICC profiles for each paper with XRite's i1Profiler system.

To further optimize color accuracy, I employ ArgyllCMS to create device link profiles, a method known as "Image Dependent Gamut Mapping." This refined process elegantly maps image-specific colors to the printer's gamut with minimal distortion or unnecessary compression. Paper is the instrument I use to realize my performances — the prints.

For this book, I selected Hahnemühle Photo Rag 188 gsm—for its balance between texture, weight, and archival integrity. It's the lighter counterpart to the renowned Photo Rag 308 gsm, fully compliant with archival standard ISO-9706-1994.

3.2 Why image dependent gamut mapping

Flowers, a frequent subject in my work, often exhibit colors that exceed the gamut of typical displays and printers. Traditional gamut mapping may cause hue shifts or compress tones, and other artifacts, reducing color accuracy.

Image Dependent Gamut Mapping selectively preserves natural color relationships, ensuring faithful prints. Automation ensures that precision and consistency are maintained across diverse images.

> *"When images are stored in large gamut colorspaces (such as L*a*b*, ProPhoto, scRGB etc.), then using the colorspace gamut as the source gamut for gamut mapping is generally a bad idea, as it leads to overly compressed and dull images. The correct approach is to use a source gamut that represents the gamut of the images themselves. This can be created using tiffgamut, and an example workflow is as follows." – ArgyllCMS*

3.3 Print Longevity

I chose the Epson SureColor P700 for its carbon-based pigment black inks, renowned for extraordinary archival stability.

Wilhelm Imaging Research Report:

Epson SureColor P700 & P900 Table 2 for B&W [31] indicates longevity exceeding 400 years under optimal conditions. Stored carefully in a book or archival box, these prints achieve unparalleled preservation.

3.4 Final Thoughts

A print transcends mere ink and paper—it's the culmination of deliberate intention, technical expertise, and artistic vision. My relentless pursuit of excellence in printing goes beyond mere accuracy; it breathes life into an image. Reflecting on Ansel Adams' words, I understand clearly now: *"The negative is the score, and the print is the performance."* For me, the print is where all decisions become alive.

3.5 Further Reading

- Image Dependent Gamut Mapping [19]
- Platinomicon (Mike Ware) [26]

There are many papers available on this subject, here you can choose: Image Dependent Gamut Mapping [20]

4 Color Management & ICC Profiling

I perform all my color management using an i1 Pro 2 spectrophotometer (X-Rite i1 Pro 2). For detailed analysis of gamut, black & white points, and other ICC profile characteristics, I utilize ColorThink Pro and GamutVision Additional guidance comes from the ICC White papers [18]

- **Spectrophotometer:** X-Rite i1 Pro 2 — used for profiling screen and paper, and printer combinations [18]
- **Gamut Analysis Tools:**
  - ColorThink Pro [12]
  - GamutVision (free) [16]

4.1 Measurement Protocol & Viewing Conditions

All black and white linearization and profiling was done using M2-mode spectrophotometric measurements, which exclude ultraviolet light. As a result, these prints are optimized for display under UV-filtering glass or acrylic — the standard in conservation and institutional environments.

Viewers will perceive tonal structure and neutrality exactly as intended, without the false enhancements caused by OBAs and UV-rich lighting.

4.2 B&W Printing

Most inkjet printers are RGB-based; even dedicated B&W modes benefit from RGB images (R=G=B). However, manufacturers' profiles typically cater only to their own papers. For third-party papers, I create custom ICC profiles specifically for B&W using ABWProfileMaker and ArgyllCMS, achieving precise neutrality and linear grayscale reproduction.

For advanced control over neutrality and tonal gradation, QuadTone RIP enables precise, individual ink control exclusively for black-and-white printing.

A perfectly neutral print serves as a starting point, imbuing it with life and character is where artistic intent transforms technique into expression.

- **ICC Profile Creation** [21]
- **ABW Profile Maker (GitHub)** [2]
- **Ansel Adams: The Camera** [3]
- **Ansel Adams, The Print** [5]
- **Ansel Adams: The Negative** [4]

Purpose: To achieve near-neutral, quasi-perfect linear grayscale tones with minimal color ink usage.

5 Materials & Archival Considerations

Every element in this project has been carefully selected for its archival stability, longevity, and craftsmanship. From printing inks to paper fibers, from binding thread to storage enclosure, every decision reflects a commitment to permanence and artistic integrity.

5.1 Printing

- **Printer:** Epson SureColor P700 — 10-color pigment-based archival printer with carbon-based black inks.
- **Inks:** Epson UltraChrome Pro10 — tested for over 400 years of permanence under controlled conditions.
- **Print Longevity:** Wilhelm Imaging Research – Epson P700 Report [9]

5.2 Paper

- **Printed Pages:** Hahnemühle Photo Rag 188 gsm [17](100% cotton, acid-free, lignin-free, ISO 9706 certified [22])
- **OBAs:** Very low [7]

See the second column in the report here [34]—it clearly shows how shielding prints from UV light can more than double their longevity.

5.3 Interleaving Sheets

- **Material:** Kozo 30 gsm (Japanese mulberry paper) — extremely thin, strong, acid-free, made from renewable fibers
- **Purpose:** Prevents abrasion between facing prints without altering visual balance
- **Reference:** Japanese Paper Place [23]

5.4 Thread & Assembly

- **Thread:** Linen or waxed cotton thread
- **Note:** Chosen for flexibility, strength, and archival durability
- **Adhesives:** Only archival, acid-free adhesives such as wheat starch paste were used

5.5 Binding and Enclosure

All pages are bound between Peterboro Museum Board covers. This material offers excellent dimensional stability and is free of lignin and optical brighteners, ensuring suitability for long-term conservation.

The book is stored in a clamshell box made from archival-quality materials. This enclosure protects the contents from light, dust, and handling damage, while supporting flat storage under stable environmental conditions.

6 Environmental & Ethical Considerations

This book was created in full alignment with archival and environmental best practices.

7 Notes On The Relevance Over Time

The methods, standards, and links mentioned in this document reflect best practices as of its writing.

References

[1] *3DLut Creator*. https://3dlutcreator.com/.

[2] *ABW Profile Maker*. https://github.com/doug3236/ABWProfilePatches.

[3] *Ansel Adams: The Camera, ISBN 0-8212-1092-0 HC*. https://www.anseladams.com/products/ansel-adams-the-camera.

[4] *Ansel Adams: The Negative, ISBN 0-8212-2186-8 PB*. https://www.anseladams.com/products/ansel-adams-the-negative.

[5] *Ansel Adams: The Print, ISBN 0-8212-1526-4*. https://www.anseladams.com/products/ansel-adams-the-print.

[6] *ArgyllCMS*. https://www.argyllcms.com/.

[7] *Article: Optical Brightening Agents*. https://www.aardenburg-imaging.com/optical-brighteners-obas/.

[8] *Brightness and Whiteness*. https://industrialphysics.com/knowledgebase/articles/how-are-brightness-whiteness-related/.

[9] *Camera SSF Estimation*. https://github.com/Beep6581/dcamprof.

[10] *Clarkvision: Digital Signal to Noise*. https://clarkvision.com/articles/digital.signal.to.noise.

[11] *ColorChecker Passport Photo 2*. https://www.xrite.com/categories/calibration-profiling/colorchecker-classic-family/colorchecker-passport-photo-2.

[12] *ColorThink*. https://www.chromix.com/colorthink/#overview.

[13] *Darktable – Scene-referred workflow*. https://docs.darktable.org/usermanual/3.6/en/overview/workflow/edit-scene-referred/.

[14] *DCamProf*. https://github.com/Beep6581/dcamprof.

[15] *FastRawViewer: Using Full Dynamic Range*. https://www.fastrawviewer.com/blog/how-to-use-the-full-dynamic-range-of-your-camera.

[16] *Gamut Vision*. http://www.gamutvision.com/modules.php?name=Download.

[17] *Hahnemühle Photo Rag 188 gsm*. https://www.hahnemuehle.ca/photo-rag/.

[18] *i1 Pro 2 Spectrophotometer*. https://www.xrite.com/categories/calibration-profiling/i1photo-pro-2.

[19] *Image Dependent Gamut Mapping*. https://argyllcms.com/doc/Scenarios.html#LP3.

[20] *Image Dependent Gamut Mapping*. https://scholar.google.ca/scholar?q=%22image+dependent+gamut+mapping%22&hl=en&as_sdt=0&as_vis=1&oi=scholart.

[21] *International Color Consortium*. https://www.color.org/index.xalter.

[22] *ISO 9706 certified*. https://cdn.standards.iteh.ai/samples/17562/34a23f9c75e44bc0a5b582d3f3608d35/ISO-9706-1994.pdf.

[23] *Japanese Paper Place*. https://www.japanesepaperplace.com/haini-kozo-37-5g-custom-10m/.

[24] *LibRaw*. https://www.libraw.org/.

[25] *Lightroom*. https://www.adobe.com/ca/products/photoshop-lightroom-classic.html.

[26] *Mike Ware: Platinomicon*. https://www.mikeware.co.uk/downloads/Platinomicon.pdf.

[27] *Photoshop*. https://www.adobe.com/ca/products/photoshop-lightroom-classic.html.

[28] *Printer test image*. https://www.outbackphoto.com/printinginsights/pi048/essay.html.

[29] *PureRaw*. https://www.dxo.com/dxo-pureraw/.

[30] *RawDigger: Beware of the Histogram*. https://www.rawdigger.com/howtouse/beware-histogram.

[31] *Report on Epson SureColor P700 & P900 Table 2 for B&W*. https://www.wilhelm-research.com/epson/WIR_Epson_SureColor_P700_and_P900_Printers_2021_07_23.pdf.

[32] *Scene-referred vs. Display-referred*. https://ninedegreesbelow.com/photography/display-referred-scene-referred.html.

[33] *Usable dynamic range during post-processing*. https://en.wikipedia.org/wiki/Exposing_to_the_right.

[34] *Wilhelm Research Report*. http://www.wilhelm-research.com/Canson/WIR_Canson_Fine_Art_and_Photo_Papers_Final_Report_2020-06-01.pdf.

"Rêveries" — Yves Gauvreau
https://github.com/GauvreauYves/FineArtBooks/tree/main/Reveries

Archived version at Archive.org
https://archive.org/details/gauvreau-reveries-archive/Reveries/

Access to all digital works and updates

"A true photograph need not be explained, nor can it be contained in words."

— Ansel Adams